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(54) **Cap assembly for threadless bicycle headset**

(57) A cap assembly for a threadless bicycle headset is provided. The cap assembly includes a fastener (23) and an outer cap (40) integrally combined with an exterior of the fastener (23). By the above structure, the integrated cap assembly has a simplified assembling process and improved stability over the prior art.

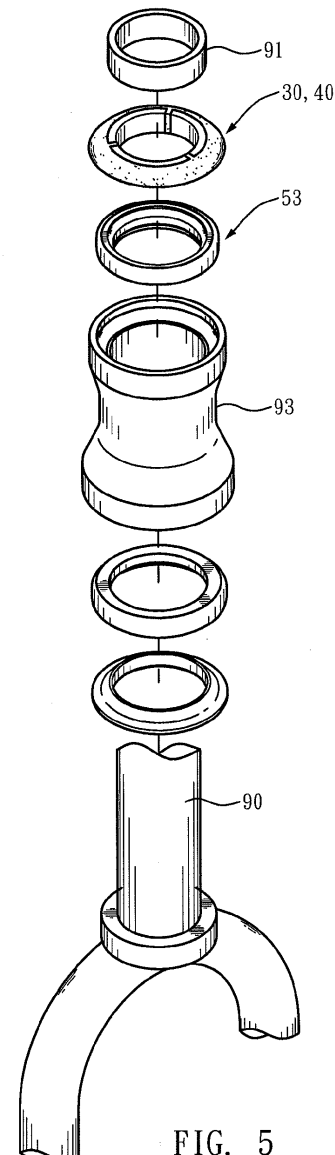


FIG. 5

Description

BACKGROUND OF THE INVENTION

1. Technical Field

[0001] The present invention relates to a cap assembly according to the preamble of Claim 1. Accordingly, the present invention severally relates to bicycle cap assemblies and more particularly, to a cap assembly that combines a cap, a fastener and a seal ring of a conventional headset as an integrated assembly.

2. Description of Related Art

[0002] **Figure 1 depicts an upper bearing of a conventional headset. The upper bearing includes a cup 21, a ball retainer 221, a race 222, a fastener 23 and a cap 4.** The cup 21 is coupled with an upper end of a head tube 93. The ball retainer 221 is set in the cup 21. The race 222 is deposited on the ball retainer 221. A steerer 90 passes inside the head tube 93. The fastener 23 is mounted around the steerer 90 and abuts upon an inner wall of the race 222. The cap 24 is mounted around the steerer 90 and, with the presence of an assembled stem 91, presses downward against the fastener 23 so that the fastener 23 firmly positions the race 222 and the ball retainer 221, and in turn makes the steerer 90 firmly held, thereby positioning the entire upper bearing and tubes. A rubber ring 25 is provided at an inner wall of the cap 24 for closely fitting with an outer wall of the steerer 90 as an oil seal.

[0003] To assemble the above upper bearing, at least the following steps have to be manually performed:

- In the first step, placing the cup 21 on the upper end of the head tube 93;
- In the second step, putting the ball retainer 221 in the cup 21;
- In the third step, assembling the race 222 to the ball retainer 221;
- In the fourth step, mounting the fastener 23 on the race 222;
- In the fifth step, coupling the rubber ring 25 with the cap 24;
- In the sixth step, covering the cap 24 on the fastener 23; and
- In the seventh step, by fixing the stem 91, pressing the cap 24 downward to press against the fastener 23, so that the fastener 23 comes to position the race 222 and the ball retainer 221, thereby firmly holding the steerer 90.

[0004] From the above description, it is obvious that each of the individual components composing the conventional upper bearing requires an individual step to install it, causing the entire assembling process complex, labor-consuming and time-consuming.

SUMMARY OF THE INVENTION

[0005] In view of the defects of the conventional upper bearing due to its numerous components, the present invention herein provides an integrated cap assembly.

[0006] One objective of the present invention is to provide a cap assembly for a threadless bicycle headset, wherein the cap assembly helps to reduce the number of components in an upper bearing, thereby simplifying and abridging the assembling process, while the stability of the resultant structure can be also improved.

[0007] To achieve these and other objects of the present invention, the invention provides a cap assembly according to claim 1. Further embodiments of the invention are described in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The invention as well as a preferred mode of use, further objectives and advantages thereof will be best understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawing, wherein:

Figure 1 depicts a conventional upper bearing for a bicycle headset;

Figure 2 is a perspective view of a cap assembly of the present invention taken from a first visual angle;

Figure 3 is another perspective view of the cap assembly of the present invention taken from a second visual angle;

Figure 4 is a cross-section view of the cap assembly of the present invention;

Figure 5 is a schematic view illustrating the cap assembly of the present invention assembled to a bicycle headset; and

Figure 6 is a cross-sectional view of the disclosed cap and the bicycle headset assembled together.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0009] While a preferred embodiment provided hereinafter for illustrating the concept of the present invention as described above, it is to be understood that the components of the embodiment shown in the accompanying drawings are depicted for the sake of easy explanation and need not to be made in scale. Besides, like numerals are used throughout this description to describe similar or identical parts, unless otherwise indicated.

[0010] Referring to **Figures 2 and 3**, a cap assembly of the present invention includes a fastener 30 and an outer cap 40 integrally combined with an exterior of the fastener 30.

[0011] The fastener 30 is composed of a plurality of separate fastening petals 31, 32, 33 arranged as a circle. The outer cap 40 is molded with a rubber material and connects with upper curved edges of the fastening petals

31, 32, 33. The outer cap **40** further has a plurality of connecting ribs **41** protruding centripetally, and each of the connecting ribs **41** is configured to be flanked by two adjacent said fastening petals **31, 32, 33**, so as to associate the separate fastening petals **31, 32, 33**.

[0012] As shown in Figures **3** and **4**, the outer cap **40** and the fastener **30** may be provided at borders therebetween with a retaining groove **45** and a flange **35** that are configured to engage with each other, so as to ensure the combination between the outer cap **40** and the fastener **30**, and provide a watertight function. The fastener **30** has a fastening segment **36** extending axially downward from a bottom of the outer cap **40**. A sloping lower pressing surface **37** is formed at an outer wall of the fastening segment **36**.

[0013] Figures **5** and **6** show the cap assembly of the present invention assembled with a bicycle upper bearing. The upper bearing includes the conventional cup **50**, ball retainer **51** and race **52**. In the present embodiment, the cup **50**, ball retainer **51** and race **52** are pre-fabricated as a bearing unit **53**. The bearing unit **53** is mounted on an upper end of a bicycle head tube **93** that further receives a steerer **90** passing therein. The cap assembly of the present invention is then mounted around the steerer **90** to be set on the race **52** of the bearing unit **53**. An outer surface of the fastening segment **36** thus comes into contact with a vertical inner periphery **521** of the race **52**, while the sloping lower pressing surface **37** comes into contact with an upper pressing surface **522** of the race **52** sloping complementarily. The outer cap **40** thus covers over the entire top of the cup **50**. A stem **91** then sleeves an upper portion of the steerer **90** and presses downward to retain the cap assembly, so that the cap assembly firmly positions the bearing unit **53** and thereby holds the steerer **90** tight.

[0014] The assembling process of an upper bearing with the disclosed the cap assembly undergoes the following steps:

In the first step, assembling the bearing unit **53** with the upper end of the head tube **93**;

In the second step, mounting the cap assembly on the bearing unit **53**; and

In the third step, by fixing the stem **91**, pressing the cap assembly downward, so as to make the fastener **30** firmly position the race **52** and the ball retainer **51**, thereby holding the steerer **90** tight.

[0015] Thus, as compared with the conventional upper bearing, the present invention reduces four assembling steps in the assembling process. By simplifying the components in the upper bearing, the cap assembly of the present invention substantially lessens the assembling work of the novel upper bearing, thus realizing a more convenient, economic and rapid assembling process.

[0016] When the cap assembly of the present invention is positioned by the stem **91**, the contacting upper pressing surface **522** of the race **52** and the lower pressing

surface **37** of the fastener **30** jointly force the fastening petals **31, 32, 33** of the fastener **30** to converge centripetally, and to compress the rubber connecting ribs **41** positioned therebetween. Since the connecting ribs **41** are flanked by two adjacent said fastening petals **31, 32, 33**, they are spaced equidistantly along the circular periphery of the fastener **30**. At this time, the connecting ribs **41** and the outer cap **40**, both made of the rubber material, ensure the fastening petals **31, 32, 33** to equally move when they converge centripetally, so that the fastener **30** can generate a centripetal compressing force to not only hold the steerer **90** tight but also make the steerer **90** positioned centrally.

[0017] Briefly, the cap assembly of the present invention combines the fastener, the cap, and the seal ring in the cap of the conventional upper bearing into a pre-fabricated integrated assembly. Thereby, a single assembling step can position the seal ring, the fastener and the cap at the same time, and achieve the multiple functions of fastening the steerer, centralizing the steerer, posing the upper bearing watertight and dustproof, positioning the ball retainer as well as the race, and improving the stability of the overall structure.

[0018] The present invention has been described with reference to the preferred embodiment and it is understood that the embodiment is not intended to limit the scope of the present invention. Moreover, as the contents disclosed herein should be readily understood and can be implemented by a person skilled in the art, all equivalent changes or modifications which do not depart from the concept of the present invention should be encompassed by the appended claims.

Claims

1. A cap assembly, being used with a threadless bicycle headset and **characterized in:**
 - a fastener (23); and
 - an outer cap (40) integrally combined with an exterior of the fastener (23).
2. The cap assembly as claimed in Claim 1, wherein the fastener (23) comprises at least two fastening petals (31)(32)(33) that are separate from each other by a predetermined distance and circularly arranged along an inner wall of the outer cap (40).
3. The cap assembly as claimed in Claim 2, wherein the outer cap (40) is integrally formed by a rubber material.
4. The cap assembly as claimed in Claim 3, wherein the outer cap (40) further has a plurality of connecting ribs (41) protruding centripetally, and each of the connecting ribs (41) is configured to associate two adjacent said fastening petals (31)(32)(33).

5. The cap assembly as claimed in Claim 1, wherein the outer cap (40) and the fastener (23) are provided at borders therebetween with a retaining groove (45) and a flange (35) that are configured to engage with each other.

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6. The cap assembly as claimed in Claim 1, wherein the fastener (23) has a fastening segment (36) extending axially downward from a bottom of the outer cap (40).

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7. The cap assembly as claimed in Claim 6, wherein the fastening segment (36) has a sloping lower pressing surface (37).

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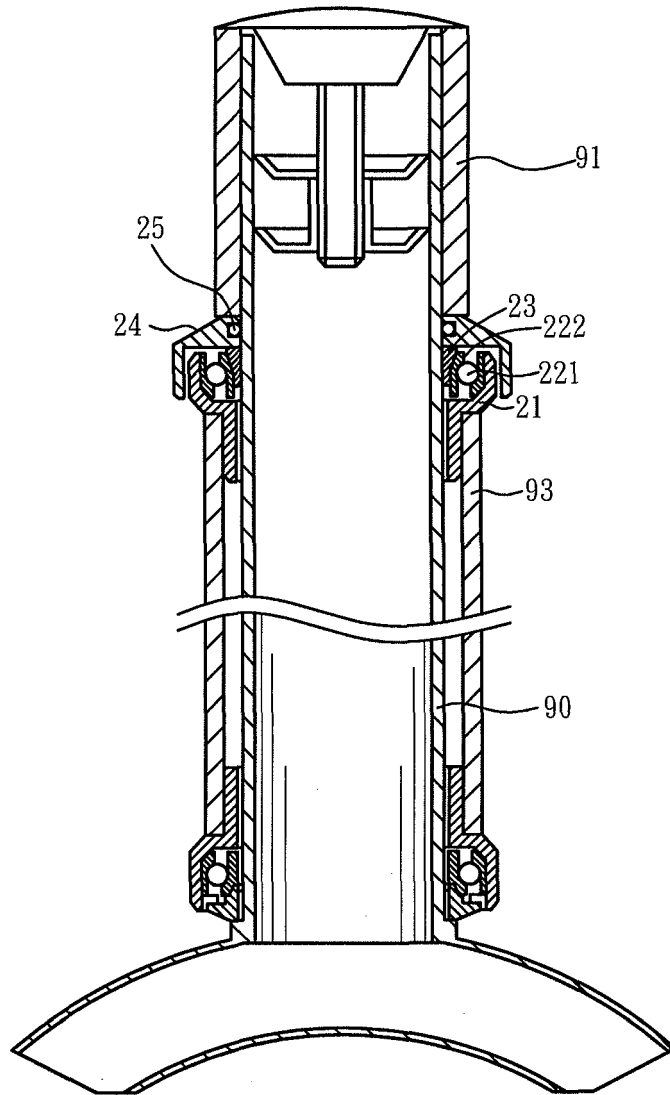


FIG. 1(PRIOR ART)

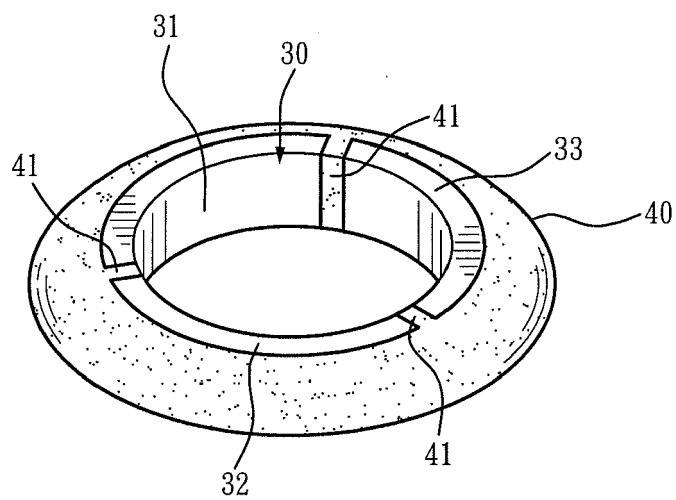


FIG. 2

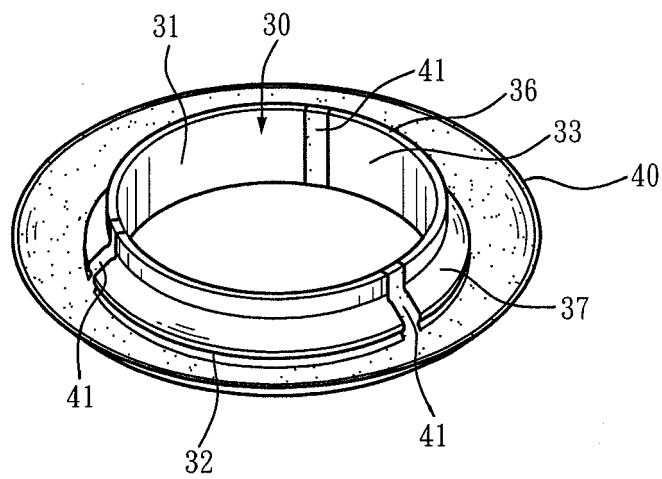


FIG. 3

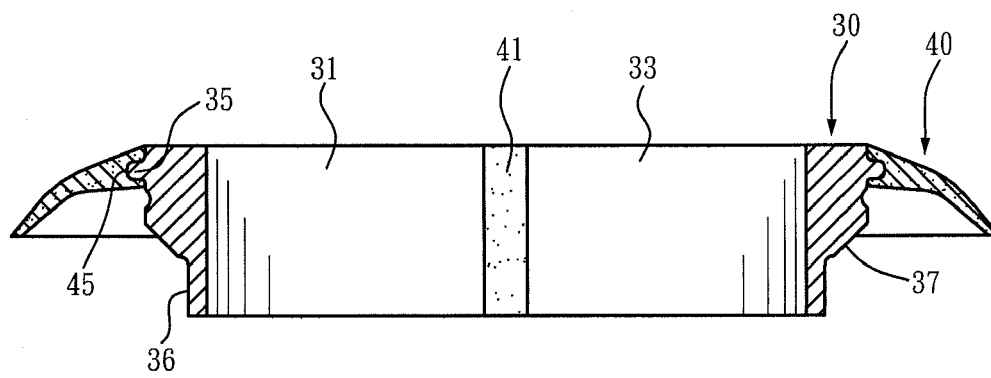


FIG. 4

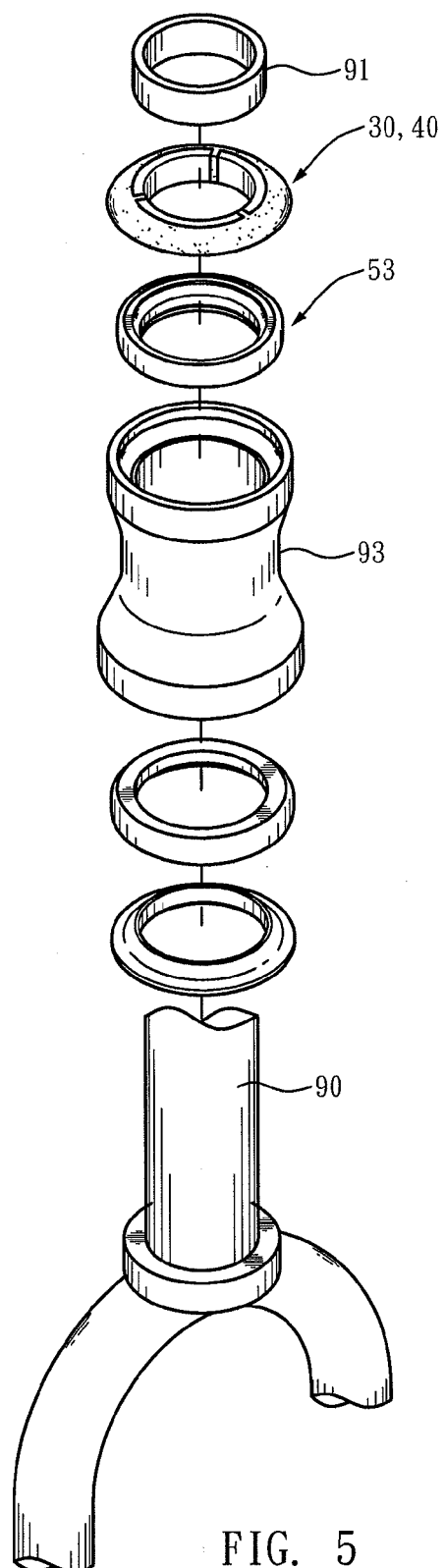


FIG. 5

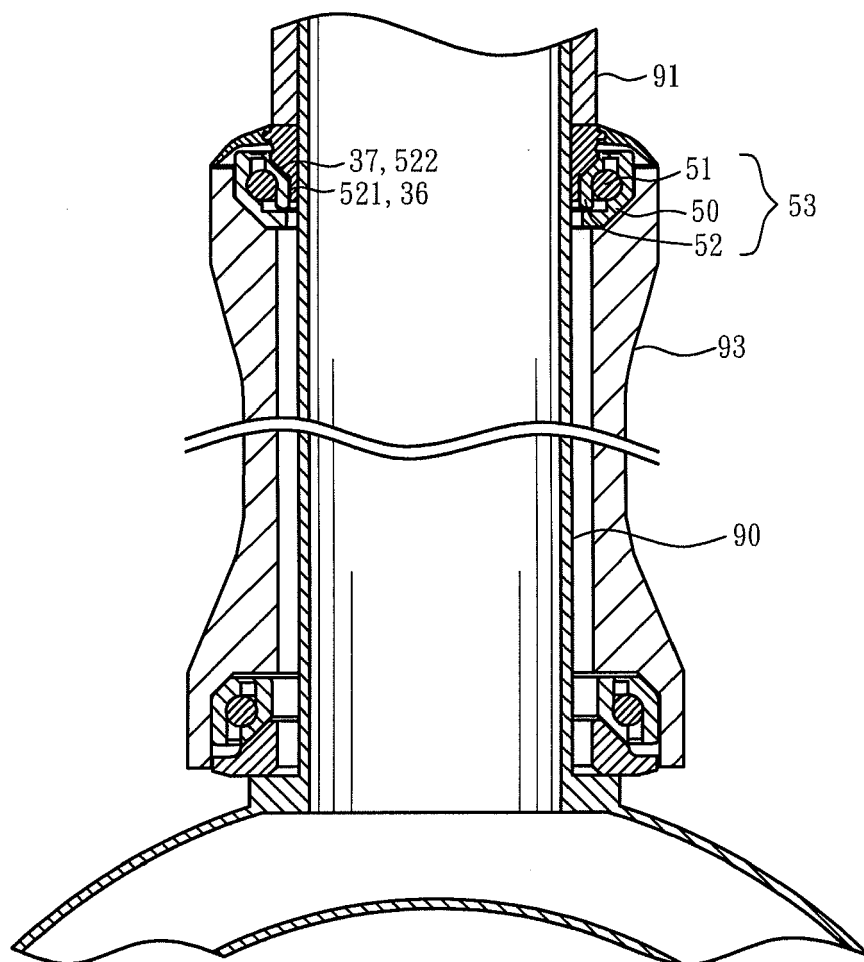


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 09 17 6853

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 332 735 B1 (WANG FU-CHUN [TW]) 25 December 2001 (2001-12-25) * figures 3B,6 *	1-7	INV. B62K21/06
X	EP 2 003 049 A1 (CHIN HAUR INDUSTRY CO LTD [TW]) 17 December 2008 (2008-12-17) * figures 4,5 *	1-3,5-7	
X	US 2003/121357 A1 (JIANG CHENG-XUN [TW]) 3 July 2003 (2003-07-03) * figures 2-5 *	1-7	
A	DE 196 30 464 A1 (STAUDE HARALD [DE]) 29 January 1998 (1998-01-29) * figure 2 *	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
			B62K
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		7 April 2010	Booij, Nico
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 17 6853

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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07-04-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6332735	B1	25-12-2001	NONE
EP 2003049	A1	17-12-2008	NONE
US 2003121357	A1	03-07-2003	NONE
DE 19630464	A1	29-01-1998	NONE